

# **Bunker fuels and the Kyoto Protocol: How ICAO and the IMO failed the climate change test**

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European Federation for  
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## Summary

Emissions from aviation and marine 'bunker' fuels form a significant part of the global climate problem – almost 10%. The Kyoto Protocol assigned responsibility for reducing bunker greenhouse gas emissions to developed (Annex 1) countries working through the International Civil Aviation Organisation (ICAO) and International Maritime Organisation (IMO), both United Nations agencies.

Studies and discussions have followed for almost 12 years but neither organisation has agreed one single binding measure to control emissions. Icao has actively ruled out the most obvious measures. The IMO has focused on technical discussion around standards. Debate in both organisations is now deadlocked over whether any measures should be global or differentiated. Developed countries want global measures so as to avoid competitive distortion.

Such an approach is also consistent with the principles of equal treatment which ICAO and the IMO have historically followed in other areas. Influential developing countries, however, insist that the principle guiding action on global climate change is that of common but differentiated responsibilities which means that responsibility to take mitigating action rests with developed countries.

Governments will meet in Copenhagen in December 2009 to agree on additional measures needed to address climate change and on new greenhouse gas mitigation targets and provisions under the Kyoto Protocol. ICAO and the IMO are striving to demonstrate that they have made progress on climate change and just need some more time. But many governments are frustrated at the inaction and are starting to press for the Copenhagen agreement to reshape the framework for addressing bunker emissions by itself, setting reduction targets and specifying the nature of necessary measures and timelines. NGOs are maintaining pressure on ICAO and the IMO to act now as they are the expert bodies to deal with matters which involve complex industrial issues with a potentially significant economic impact. But if these efforts fail – and chances don't look good – NGOs will press for action to be taken at Copenhagen.

## Introduction

Bunker fuel is technically any type of fuel used aboard ships and acquired its name from the containers used to store fuel onboard or in ports. The name subsequently came to be applied to aviation fuel as well.

There was considerable discussion of bunker fuels at the Earth Summit in Rio in 1994 and in the years thereafter given the international character of the bulk of these emissions. The UN's Intergovernmental Panel on Climate Change (IPPC) Guidelines for National Greenhouse Gas Emissions first drafted in 1994 stated that emissions from international aviation and marine bunker fuels should be calculated as part of the national greenhouse gas (GHG) inventories of Parties but should be excluded from national totals and reported separately because of their international character.

This decision proved over time to weaken the incentive to restrict bunker emissions as they weren't included in national targets. Bunker emissions already represented 3% plus of CO<sub>2</sub> emissions reported by developed countries in 1990 and this share of total emissions was growing steadily.

The control of bunker emissions was also contentious given the competitive nature of both international aviation and maritime trade. Bunkers were also regarded as difficult to resolve because with emissions rising, some countries – eg those with large ports or large aviation hubs – stood to lose out if emissions were allocated on the basis of bunker sales.

Bunker fuel use typically represents 10-15% of developed countries' transport emissions, but in some cases the figure is much higher than this - 20 to 40%. In the Netherlands, it is over 50%. Governments consequently feared political difficulties due to competitive distortions if unilateral action were taken to regulate bunker fuels. Some options to reduce emissions were also constrained by international agreements. Restrictions in the Chicago Convention on taxing aviation fuel arriving on board an aircraft had led to widespread proscription of the taxation of aviation fuel.

The UN's aviation and maritime specialised agencies, ICAO and the IMO also had an oversight role over these industries so might be expected to have a say on any proposed mitigation measures.

At the Conference of the Parties (COP1) of the UN Framework Convention on Climate Change (UNFCCC) established at Rio the previous year, the Convention's Subsidiary Body on Technical Advice, (SBSTA), was requested to examine the allocation and control of emissions from international bunker fuels. UNFCCC had identified 8 options for SBSTA to consider the following year. SBSTA subsequently rejected three options; allocation in proportion to national emissions; according to the country of origin of the passenger/cargo and according to the location of the actual emission. The five remaining options were, however, left open as no agreement could be reached on their importance:

- No allocation
- Allocation to the country where the bunker fuel is sold
- Allocation to the country of the transporting company; the country of registration of the aircraft/vessel, or the country of the operator
- Allocation to the country of departure or destination of the aircraft/vessel (including sharing emission between them)
- Allocation to the country of departure or destination of the passenger/cargo (including sharing emissions)

## The Kyoto Protocol: responsibility for bunker emissions handed to ICAO and IMO

The Kyoto Protocol to the UNFCCC, adopted at COP 3 in December 1997, contains provisions for reducing greenhouse gas emissions from aviation and shipping and treats these sectors in a different way to other sources, including different approaches for international and domestic emissions. Domestic aviation and shipping emissions are included in national targets for developed (denoted 'Annex 1') countries with an overall reduction target in total emissions from all sources of 5.2 per cent for 2008-2012 (compared with 1990 levels).

Emissions from international aviation and shipping are treated separately in Article 2.2:

*"Parties included in Annex 1 shall pursue limitation or reduction of emissions of greenhouse gases not controlled by the Montreal Protocol from aviation and marine bunker fuels, working through the International Civil Aviation Organization and the International Maritime Organization, respectively".*

[The Montreal Protocol regulates substances responsible for ozone depletion]

COP 3 also urged SBSTA to elaborate further on the inclusion of international bunker emissions in the overall greenhouse gas inventories of Parties.

So responsibility for cutting bunker emissions was not given to individual countries (Parties) – thus bypassing the allocation problems confronting SBSTA. Reductions *by Annex 1 countries* should instead be achieved working through the responsible international bodies for these transport modes – ICAO for aviation and the IMO for maritime transport. SBSTA continued to discuss methodological issues for the allocation of bunker fuels in subsequent years but without agreement. ICAO and IMO also regularly report "progress" on their work. SBSTA has now deferred further consideration of the issue until 2010.

## Part I: Aviation

### ICAO post Kyoto

In 1996, a year before the Kyoto agreement, ICAO had requested that the IPCC should prepare a report on the atmospheric impact of aircraft engine emissions. The report entitled *Aviation and the Global Atmosphere*, the first by the IPCC for a specific industrial sector, was prepared in collaboration with the Scientific Assessment Panel to the Montreal Protocol and was published in 1999. Its main conclusions, were that:

- Aviation passenger traffic had grown at nearly 9% per annum since 1960 and was projected to grow at 5% per annum between 1990 and 2015;
- Aircraft accounted for 2% of anthropogenic CO<sub>2</sub> emissions in 1992
- aircraft emit gases and particles which alter the atmospheric concentration of greenhouse gases, trigger the formation of condensation trails and may increase cirrus clouds, all of which contribute to climate change;
- aircraft were estimated (in the base year 1992) to contribute about 3.5 per cent of the total radiative forcing (a measure of change in climate) by all human activities and this percentage, which excludes the effects of possible changes in cirrus clouds, is projected to grow; although improvements in aircraft and engine technology and the efficiency of the air traffic system will bring environmental benefits, they will not fully offset the effects of the increased emissions resulting from the projected growth in aviation.

Policy options identified to reduce emission further included more stringent engine regulations, the removal of subsidies and incentives that have negative environmental consequences, environmental levies (charges and taxes), emissions trading, and voluntary agreements. It was noted that ICAO had already started work to assess the need for aircraft emission standards at cruise altitude to complement existing NO<sub>x</sub> LTO standards;

The 32nd Session of the Assembly of ICAO; held in September 1998, underlined the importance of ICAO's responsibilities under Kyoto and requested the Council, through the Committee on Aviation Environmental Protection (CAEP), to study policy options to limit aviation GHG taking into account the findings of the 1999 IPCC Report and report back to the Assembly at its next session three years later. The CAEP, duly established that year three working groups to consider different aspects of aircraft engine emissions; the further development of technology and related worldwide standards; the reduction of fuel burn through improved operational measures and exploration of the potential role of market based options. ICAO reported to COP 4 in November of that year that following agreement on a higher LTO NO<sub>x</sub> stringency, CAEP would study a new emissions parameter to cover climb and cruise emissions and include CO<sub>2</sub> as well as NO<sub>x</sub>. It also told COP 4 that market based measures eg emissions related levies (charges or taxes) and emissions trading were also being considered.

## Fuel taxes and ICAO

Fuel taxes are one of the principal market based options and an extremely powerful and 'first best' tool for reducing energy consumption, oil dependence and thus GHG. However they occupy a special position in international aviation.

The Chicago Convention, which established ICAO, prohibits the taxing on arrival of fuel already onboard an aircraft. This prohibition, taken to stimulate international trade after World War II, was widely extended by Governments in subsequent years to a general tax exemption for fuel on international flights. The prohibition was further enshrined in a very large number of bilateral aviation agreements.

In 1996, a year before Kyoto, the ICAO Council adopted a Resolution that "*strongly recommends that any environmental levies on air transport which States may introduce should be in the form of charges rather than taxes*". This resolution was endorsed at ICAO's 33<sup>rd</sup> Assembly in September 2001, which "*Recognized the continuing validity of Council's Resolution of 9 December 1996 regarding emission-related levies*". In ICAO's view taxes were levies to raise general national and local government revenues to be applied for non-aviation purposes whereas charges were seen as levies to defray the costs of providing facilities and services for civil aviation. ICAO's 2001 decision was important and effectively killed the possibility of developing further work on the use of kerosene taxation as an instrument to internalise the external costs of international aviation, including its impacts on climate change. A few countries maintain taxes on *domestic* aviation fuel – eg the USA. Most countries also exempt aviation ticket taxes and aircraft purchases from VAT. Many airlines saw fit to impose a fuel surcharge during the oil price spike of the past couple of years.

The Council did request that CAEP continue its work on the application of an en-route levy or a fuel levy to address global emissions. The IPCC in 1999 had noted an OECD study suggesting that a levy increasing aviation fuel prices by 5% a year could reduce emissions at least 30% by 2020. Another study estimated that the effect of an environmental charge on civil aviation in Europe could reduce the rate of growth of emissions by approximately 50%.

## Emissions standards for aircraft

CAEP, at its 5<sup>th</sup> meeting in January 2001, endorsed continuing methodological work on calculating emissions in the climb and cruise phases of flight but decided not to pursue the possibility of developing a cruise engine efficiency parameter that would have provided the basis for an ICAO aircraft standard limiting CO<sub>2</sub>. CAEP concluded that a standard would be very difficult in view of the great diversity of operations and noted that market pressures already ensured that aircraft are very fuel efficient. "*While this work has not reached the stage where specific recommendations could be made, the conclusion was reached that CAEP should not pursue further the possibility of developing a carbon dioxide standard*". Even though the discussion about technical measures was still at an early stage, CAEP 5 decided to rule out the possibility of establishing CO<sub>2</sub> emissions standards for aircraft. In March 2001 the ICAO Council endorsed the CAEP 5 recommendations. This decision notwithstanding, CAEP 6 in February 2004 found the political will to agree on a tightening of aviation NO<sub>x</sub> landing and takeoff (LTO) emission standards for new aircraft from 2008. The action on LTO NO<sub>x</sub> was intended to improve air quality around airports. For current generation engines, LTO NO<sub>x</sub> emissions bear a positive relationship to cruise NO<sub>x</sub> emissions (which induce ozone and deplete methane, both



greenhouse gases) so the measure although never intended to address GHG would have some climate impact. But the 12% increase in stringency over the existing standard was disappointingly low and attracted much criticism. By this time also, patience with ICAO was running out. The EU's Environment Commissioner had already complained about ICAO's disappointingly slow progress on GHG.

## Operational measures

CAEP 5 also endorsed guidance material for ICAO to publish on ways to minimize fuel use and reduce emissions. Two workshops were held on the subject. CAEP 5 also endorsed a methodology for estimating fuel savings and reducing emissions using new SatNav technology. ICAO's 35<sup>th</sup> Assembly in 2004 recognised the progress on fuel use issues and "requests the Council to continue to develop the necessary tools to assess the benefits associated with ATM improvements and to promote the use of the operational measures.

The 35<sup>th</sup> ICAO Assembly in October 2004 also returned to the question of environmental charges and taxes. It reconfirmed the ICAO Council's 1996 decision to recommend charges rather than taxes but then resolved to amend Assembly Resolution A33-7 and urged "*Contracting States to refrain from unilateral implementation of greenhouse gas emissions charges prior to the next regular session of the Assembly in 2007, where this matter will be considered and discussed again*". The Assembly was effectively ruling out the use of the policy instrument that it once *preferred to taxes*, for the next three years. Just prior to the Assembly, the European Parliament passed a resolution criticising the amendment as unacceptable and a retrograde step for ICAO which would undermine the organisation's credibility. The Parliament called on ICAO urgently to implement an open emissions trading scheme and to develop emissions related levies.

Between 2004 and 2007, ICAO did not discuss GHG emission charges, focusing instead on guidance for States on Local Air Quality emissions charges. From the perspective of the fight against global warming, this represented a loss of three years.

## Market-based options

Given the recognition in the IPCC Study *Aviation and the Global Atmosphere* that improvements in aircraft and engine technology and the efficiency of the air traffic system would not fully offset the effects of the increased emissions resulting from the projected growth in aviation, ICAO's working group on market based options assessed a comprehensive range of potential measures, including fuel and en-route levies, emissions trading and voluntary programmes, all of which would target CO<sub>2</sub> emissions.

As regards emissions trading for aviation, the conclusion of these discussions was that "*a closed emissions trading system does not show cost benefit results to justify further consideration*". The application of a separate emissions trading scheme for aviation entities only was effectively ruled out by this report. CAEP 5 in January 2001 had however clearly endorsed "*that an open emissions trading system is a cost-effective solution for CO<sub>2</sub> emission reductions in the long term*". 'ICAO would play a leadership role particularly regarding proposals for caps' said CAEP's report to SBSTA. As a consequence of this CAEP 5 work, the 33rd Assembly resolution in September 2001 "*Endorses the development of an open emissions trading system for international aviation*" and "*Requests the Council to develop as a matter of priority the guidelines for open emissions trading for international aviation*".

Some stakeholders and countries at the 33<sup>rd</sup> Assembly expressed the view that any solution to be adopted should be as global as possible, this being the dominant view within the aviation industry. However, in discussions at CAEP 6 in February 2004, it was agreed that an aviation-specific emissions trading system based on a new legal instrument under ICAO's authority "...seemed sufficiently unattractive that it should not be pursued further".

In practice, with this decision, the possibility of applying emissions trading as a global solution was discarded. Instead, the 35<sup>th</sup> ICAO Assembly in September 2004 endorsed "*voluntary trading systems that interested Contracting States and international organizations might propose*" and stated that "*ICAO would provide guidance for use by Contracting States, as appropriate, to incorporate emissions from international aviation into Contracting States' emissions trading schemes consistent with the UNFCCC process.*" (Resolution 35-5) This statement was the basis for the European Commission proposal, put forward in December 2006, to include aviation in the EU Emissions Trading Scheme.

Between 2004 and 2007 an ICAO task force prepared written guidance for member states on aviation and emissions trading ie a non-binding document designed to help contracting States wishing to include aviation in their emissions trading schemes. At CAEP 7 in February 2007 there was broad agreement on the document except for one critical point; the ability of a contracting state to include any carrier, regardless of its nationality, in an emissions trading scheme. Some states, including the US, insisted that foreign carriers could only be included by mutual agreement – a provision, which, if agreed, would necessitate forging new bilateral agreements with all states involved in each and every scheme. The alternative, favoured by the EU, was to allow the state to mandate participation of foreign carriers in the absence of mutual agreement. This mutual agreement clause was to create enormous controversy and an enduring rift when ICAO's 36<sup>th</sup> Assembly considered the issue in September 2007. The Assembly voted to endorse the US supported approach of signing separate mutual agreements before including foreign carriers in emission trading schemes. But the EU together with Norway, Switzerland and Turkey entered a reservation which signaled they would ignore the provision. The vote marked a further blow to ICAO's purported lead role in tackling aviation climate change as its insistence on mutual agreement effectively rendered national or regional trading schemes unworkable or discriminatory - or both. Although a response to this dispute, the EU reservation covered the entire section on market-based measures in the Assembly resolution. This effectively meant that the EU did not recognize the validity of the continued moratorium on the application of GHG charges for aviation.

In its current work programme (2007-10), CAEP has established a new task force on market-based measures. However, with regard to GHG emissions, this is confined to looking at how various emissions trading schemes may link, developing a report on the role of offsetting, and updating the report on voluntary action by the industry.

## ICAO and the Group on International Aviation Climate Change (GIACC)

The 37<sup>th</sup> ICAO Assembly also took a decision to form a new group of 15 experts with balanced representation from each region to draw up a program of action for ICAO to address climate change – the Group on International Aviation Climate Change (GIACC). With COP 15 (Copenhagen, December 2009) on the horizon, ICAO had

effectively taken responsibility for climate change issues away from its environment committee, the CAEP, to a group of experts meeting behind closed doors.

GIACC's remit is to develop a plan by mid 2009 which would be put to a High Level Group meeting of ICAO in October, and to the Council, to endorse as ICAO's future climate change plan to be put to COP 15. GIACC has held three meetings so far interspersed with working group activity. Progress to date has been disappointing even considering the modest expectations of GIACC set by the Assembly; to draw up non-binding 'aspirational goals' that would constitute framework guidance on measures States might adopt.

GIACC 3 in February 2009 produced plenty of dissension but no agreement. beyond a short term fuel efficiency goal of an 'indicative' 2% per annum up to 2012. The Task Group on Market-based Measures reported that 'no consensus has been identified on a specific strategy for addressing emissions from international civil aviation'.

Two of the potential voluntary measures the Group had considered, were fuel taxes and emissions charges, which the IPCC had identified back in 1999 as having 'the potential to reduce aircraft emissions by providing further incentives to develop and purchase low emission technology, improve operational efficiency and reduce demand via higher fares'. The aviation industry succeeded in having included on GIACC's agenda the concept of carbon neutral growth as from about 2025 but not at the expense of industry growth. Biofuels also emerged as a potential industry saviour. ICAO has announced it will hold a conference on the topic just prior to Copenhagen and CAEP has been asked to estimate future emissions based on various uptake scenarios. Biofuels are not yet certified for use in aviation and none of those possibly suitable for aviation are available in commercial quantities. Various proposals remain on the table regarding mitigation measures but without consensus. The need for a global sectoral approach along with maintenance of ICAO's lead role is being stressed. The clash between ICAO's principle of equal treatment of operators and the need to respect common but differentiated responsibilities espoused in the UNFCCC seems to pervade all discussions.

The Measures Working Group summed up a further dilemma by observing that international aviation does not fit neatly into a model where the developed world has the most advanced industry; some of the largest airlines with the most modern fleets were based in the developing world. The GIACC 4 meeting at the end of May has a formidable task to find a consensus around a credible package of measures.

The principal industry bodies, the International Air Transport Association (IATA) and the Air Transport Action Group (ATAG), enjoy close access to the GIACC and have sought to limit measures to voluntary application. IATA's submission to GIACC 4 finally came out in support of a global sectoral approach to be managed by ICAO that would be non-discriminatory and universally applicable. Measures could include emissions trading, carbon funds, offsets or other similar mechanisms as long as they were implemented globally, 'on the basis of consensus'. and providing full and open access to the global carbon market. Only CO<sub>2</sub> emissions should be addressed; action on NO<sub>x</sub>, contrails and high altitude emissions needed to await further research. IATA also promised midterm fuel efficiency improvements of 1.5% per annum while 'striving' to achieve carbon neutral growth for aviation by 2020 to 2025 using biofuels. Several influential airlines (the Aviation Global Deal Group) had already broken ranks and called, in February 2009, for a global sectoral deal on aviation including a cap on emissions and market-based measures such as carbon trading. The International Coalition for Sustainable Aviation (ICSA), the NGO

Observer to CAEP, stressed to GIACC 3 that ICAO needed to come forward with a meaningful emissions reduction target and a realistic baseline; to develop standards which led, not followed, technology, to propose an effective global market-based measure to reduce emissions and to take action on cruise NOx.

A group of scientists, including three from the IPCC 4<sup>th</sup> Report panel, produced a report in April 2009 which updated aviation's climate impacts based on the most recent work. The radiative forcing (a metric of climate change) from aviation in 2007 was put at 4.9% of global radiative forcing. IATA was still citing in its submission to GIACC 4 that aviation's share of global CO<sub>2</sub> emissions was 2% - the figure from the 1999 IPCC report it has so regularly quoted.

## Part 2: Shipping

### IMO and Kyoto

In September 1997, just prior to Kyoto, the IMO's International Convention for the Prevention of Pollution from Ships (MARPOL) Conference resolved that IMO should undertake a study of GHG emissions from ships and that the IMO's Marine Environment Protection Committee (MEPC) should consider feasible GHG emissions reduction strategies.

The IMO study on GHG from ships undertaken by a Consortium of internationally-renowned research institutes was presented to MEPC 45 in September 2000. The study estimated that shipping accounted for 1.8% of the world's total anthropogenic CO<sub>2</sub> emissions which was a higher percentage than for many countries undertaking emission reduction obligations pursuant to Kyoto. It acknowledged that sea transport was already the most energy efficient means of freight transport, with an energy intensity two orders of magnitude lower than airfreight; so that energy efficiency improvements would make sea freight even more commercially attractive. It also noted that only 16% of tons shipped in bulk carriers began or ended their journey in non Annex 1 countries. In other words, international shipping was very much a developed country affair.

The report concluded that the potential for reducing shipping emissions via operational measures was 'significant' while technical measures could be easier to implement and enforce through international standards with application to new ships more feasible than retrofitting.

Technical measures identified to reduce emissions included optimised hull shape and propeller design, improved diesel engine efficiency and waste heat recovery systems, hull and propeller maintenance and the use of alternative fuels. Operational measures included fleet planning, use of higher quality fuels, optimised weather routings and 'just in time' voyage planning. The single measure resulting in the highest reduction of CO<sub>2</sub> emissions was identified (through case study analysis) as slow steaming; a speed reduction of 10% by the world fleet would cut emissions by 23.3% by 2010; (energy use of a ship per kilometer increases approximately with the square of the speed.). Speed reduction combined with technical and operational measures held out the prospect of over 40% GHG reductions by 2010 and over 50% by 2020. However the report concluded that there seemed to be no effective policy instruments that could lead to reduced speed and noted that if demand and the market requirement for speed continued, technical measures would not be able to prevent a total growth in emissions. The report ruled out a carbon charge on bunker fuels for a variety of reasons (but principally evasion) as well as a CO<sub>2</sub> standard for existing ships principally because it would be relatively cost ineffective as well as difficult to monitor and implement.

The report recommended a strategy of exploring the feasibility of voluntary GHG limits or environmental indexing, recommended that work should start on design standards for new ships and possibly existing vessels, and that the possibilities of 'credit trading' from additional abatement measures for new and possibly existing vessels be pursued. As regards emission trading, allocation of emission allowances was felt not to be viable, but a system of emissions credits to ship owners for reducing emissions below a baseline was considered feasible.

Consideration of the report was deferred until MEPC 46 in April 2001 due to a heavy workload of other matters but a committee was tasked with making a technical evaluation in the meantime. The evaluation noted that, inter alia, short term measures to limit or reduce greenhouse gases may only be introduced on a voluntary basis and that long-term measures should only be introduced after careful consideration by the IMO based on a holistic approach taking into account the cost-benefits to the shipping industry and the development of more detailed global bunker consumption statistics. MEPC 46 in April 2001 decided to form a working group to consider the issues.

In December 2003 the IMO assembly called upon the MEPC to identify and develop the mechanism or mechanisms for reducing GHG emissions from international shipping including the establishment of a GHG baseline; the development of a GHG emissions index for ships recognising that CO<sub>2</sub> was the main greenhouse gas emitted. MEPC was also asked to develop guidelines for applying the efficiency index and to evaluate technical, operational and market-based solutions. In July 2005, MEPC 53 approved IMO's interim guidelines for voluntary ship CO<sub>2</sub> emissions indexing. IMO requested States to test the index in trials and report back. IMO subsequently established a results database. .

## IMO greenhouse gas emissions workplan

In October 2006, MEPC 55 adopted a workplan to develop the mechanisms needed to reduce ship emissions. The work plan culminates in 2009 and includes improvements in the CO<sub>2</sub> indexing methodology, establishment of a CO<sub>2</sub> emissions baseline and consideration of technical, operational and market-based mechanisms for dealing with ship GHG emissions. In April 2008, IMO's MEPC 57 decided by overwhelming majority to adopt nine principles underpinning debate on GHG emissions. Principal among these was that any measures should be effective in reducing emissions and cost-effective; should not penalise global trade and growth and should limit or minimise competitive distortions. Even so, a number of influential states expressed reservations about the second principle; that the framework should be binding and equally applicable to all flag states in order to avoid evasion. The issue was deferred to MEPC 58 later in the year. Some indications of the political problems ahead were evident at an intersessional meeting in Oslo in June 2008 which had been convened to discuss technical matters related to the design index.

On market-based mechanisms, a number of proposals were subsequently put forward by member states. Norway, Germany and France made separate proposals on emissions trading while Denmark proposed a global levy on marine bunkers.

Many states submitted comments on these proposals including on legal avenues for implementation, for example, whether by amendments to MARPOL or through establishment of a new Convention. MEPC 58 in October 2008 revealed deep divisions amongst IMO members over the issues and in particular over seemingly conflicting principles; that of equal treatment of all ships regardless of their nationality which underpins all IMO's work; and the UNFCCC principle that measures undertaken to mitigate climate change should reflect states' common but differentiated responsibilities – in practice that Annex 1 countries have to limit their emissions while non-Annex 1 countries do not.

A mitigation approach in IMO based on nationality would be ineffective as ships can easily change flag. Debate in MEPC was stalemated and prevented any consideration of the scheduled agenda item on market-based measures. So discussion of measures was again deferred to MEPC 59 in July 2009. IMO has said

that the intention of this July meeting is to conclude discussions on possible GHG measures and finalise actions to control shipping GHG to be reported to COP 15 in Copenhagen.

## Fuel Efficiency

On the formula for fuel efficiency, renamed the Energy Efficiency Design Index, (EEDI) which is directed at the construction and design of new ships, MEPC made some progress at the intersessional meeting in March 2009 in resolving outstanding issues.

The subject is complex not least because a range of formulae and approaches are required to take account of the wide variety of ship types afloat. The EEDI is not yet ready to be adopted. A mandatory limit to the EEDI has been proposed. Whether the EEDI itself should be voluntary or mandatory is a further controversial question.

A number of delegations, as well as industry, signaled their opposition to any mandatory application of a design index for new ships e.g. for differentiation of harbour dues. This issue will be taken up again at MEPC 59. The IMO CO<sub>2</sub> Index, renamed the Energy Efficiency Operational Indicator (EEOI) is intended to measure the efficiency of existing ships and has been used in extensive trial over the last five years. It is seen as a means of improving the understanding among ship owners, charters and crew members of how the various parameters affect fuel consumption. The EEOI is expressed in grams of CO<sub>2</sub> per 'capacity mile'. It applies to individual ships and was also found to vary according to market conditions and utilization averages. Its mandatory application is also controversial (MEPC's GHG working group recommended in 2008 that it be voluntary) given the range in ship types and issues surrounding empty trips, empty containers and dense versus volume cargo. The IMO is also considering a linked Ship Efficiency Management Plan (SEMP) to promote energy efficient operations.

## Second IMO GHG Study 2009

On the eve (April 2009) of IMO's 59<sup>th</sup> MEPC session tasked with drawing up IMO's shipping GHG action plan to present to the UNFCCC meeting in Copenhagen, an expanded consortium to that which had produced the original Shipping GHG study in 2000 presented its Second IMO GHG Study 2009. The 2000 study had estimated that shipping represented about 1.8% of the world's anthropogenic emissions of CO<sub>2</sub>. The new study put the figure for 2007 at 3.3% or 2.8% (870 million tonnes of CO<sub>2</sub> annually) - if just considering international shipping. Moreover, it predicted that if left unchecked, emissions would rise to 1250 million tonnes annually or c. 6% of global emissions by 2020 and increasing 150 to 200% over 2007 levels by the year 2050.

The report also noted that emissions of CO<sub>2</sub> from shipping lead to positive "radiative forcing" and to long-lasting global warming. In the shorter term, the global mean radiative forcing from shipping is negative (principally due to sulphur emissions) and implies cooling; however, regional temperature responses and other manifestations of climate change might still occur. In the longer term, the report concluded that emissions from shipping will result in a warming response as the long-lasting effect of CO<sub>2</sub> will overwhelm any shorter-term cooling effects.

The report concluded that if climate is to be stabilized at no more than 2°C warming over pre-industrial levels by 2100 and emissions from shipping continue as projected in the scenarios cited in the report, then they would constitute between 12% and 18% of the global total CO emissions permissible in 2050 to achieve stabilisation (by

2100) with a 50% probability of success. The overall average annual growth in shipping tonne-miles 1970 to 2007 was put at 4.1%. The report also noted that CO<sub>2</sub> is the most important GHG emission from shipping, and the potential benefits from reducing emissions of the other GHGs were small in comparison. 36% of ship traffic was reported to be active within 25 nautical miles (nm) of shore, 44% within 50 nm. and 70% within 200 nm. of shore.

The report itself concluded that very substantial reductions of shipping emissions are possible. Improved ship design alone could reduce CO<sub>2</sub> emissions by between 10-50%, while improved operational arrangements could result in another 10-50% reduction. The two approaches combined could reduce CO<sub>2</sub> emissions by up to 75%. A marginal abatement cost analysis in the same IMO study concluded that, by 2020, existing ships could, without incurring any additional costs, reduce their CO<sub>2</sub> emissions by 255 million tonnes annually: a 20% reduction in emissions without it costing industry a single dollar. It had taken the IMO over 12 years to come to this finding.

On market based instruments, the report said that both the Maritime Emission Trading Scheme (METS) and the International Compensation Fund for GHG Emissions from Ships (ICF) were cost-effective policy instruments with high environmental effectiveness. They contained the largest amount of emissions within their scope, allow all measures in the shipping sector to be used and could offset emissions in other sectors. These instruments provide strong incentives to technological change, both in operational technologies and in ship design.

The report said that a mandatory limit on the Energy Efficiency Design Index for new ships would be a cost-effective solution to incentivise the improved design efficiency of new ships but noted that its environmental effect would be limited because it would only apply to new ships and only incentivise design not operational improvements. Mandatory and/or voluntary reporting of either the EEDI or the EEOI would have no environmental effect in itself but would depend on incentive schemes being set up to make use of the information.

The report found that a mandatory limit on EEOI could be a cost-effective and strong incentive to reduce emissions from all ships that are engaged in transport work by requiring them to improve operational efficiency against a possible financial penalty. It would incentivise both technical and operational measures. However, this option is technically very challenging, due to the difficulties in establishing and updating baselines for operational efficiency and in setting targets;

The report also modelled the impact on ship efficiency of changes in the average speed of the entire world fleet, including model adjustments to the size of the world fleet due to decreased transport capacity of each ship.

Given IMO's global mandate, given by the IMO Convention itself as well as from UNCLOS, there is no precedence in any of the more than fifty IMO treaty instruments currently in existence where measures are applied selectively to ships according to their flag



## Twelve years on...

For a period extending over nearly 12 years, both ICAO and IMO have failed to achieve what Kyoto achieved for all other sectors/industries; a target for emissions reductions measured against an agreed baseline and a framework in which emission reduction measures could be undertaken.

Neither organisation has in fact seriously addressed the issue of reduction targets despite a number of pleas from the UNFCCC's Subsidiary Body on Technical Advice (SBTA) to do so. Neither organisation has this issue explicitly on its climate change agenda. Neither body has yet drawn up forecasts of future emissions aligned with UNFCCC target dates 2020 and 2050. Can either organisation be reasonably expected to take up and resolve such a complex issue at the last minute?

Nearly 12 years after Kyoto, the science of non-CO<sub>2</sub> effects of aviation on climate change remains uncertain. There has been little concerted effort to resolve these uncertainties. In early 2009, ICAO promoted a workshop on aviation biofuels reflecting industry hopes that such alternatives will arrive soon enough and in sufficient quantities to stave off demands for action.

If biofuels were to be suitable for aviation and sustainable over the full life-cycle, large-scale supplies for commercial use are not expected to be available before 2020. According to ICSA modeling, an assumed fleetwide uptake of 10% biofuels with half the CO<sub>2</sub> intensity of petroleum jet fuel would result in forecast emissions reductions of 5% by 2025.

Debate in both ICAO and IMO was, for many years, frustrated by a lack of political will; notably the USA and such friends as Australia, both then Kyoto non-signatories. More recently, progress has suffered from obstructive references to the UNFCCC principle of common but differentiated responsibilities (CBDR). China, Brazil, India and Saudi Arabia have led these arguments in IMO. A day's debate at MEPC 58 was spent on country statements addressing the principle at the expense of planned consideration of market-based measures. China does not attend CAEP but its representatives in the GIACC alongside those from Brasil have been vocal on CBDR.

The point seems to have been reached in 2008, that no concession in either ICAO or IMO would be made by developing countries on the question of CBDR in advance of the Copenhagen Conference where negotiations will cover a wider set of issues. If this assessment is correct, then the forthcoming GIACC4 and MEPC59 meetings will fail to deliver credible programs of action on climate change. At this stage, all signs are pointing in this direction.

## The ICAO and IMO Legacy

Twelve years of inaction to address greenhouse gas emissions of bunker fuels are testimony to ICAO and IMO's failure as institutions and as UN forums for collective action. Member States obviously share responsibility as do Annex 1 Parties in particular, as they bear a clear responsibility under the Kyoto Protocol to control bunker emissions. Neither organisation has yet to adopt one single measure to address climate change. The working practices of these agencies and cumbersome system of committees have contributed to the failure as has the inordinate if not extraordinary influence of industry groups on the process, the Secretariats and the political decision making of both Organisations.

In many cases there has been an evident disconnect between Transport Ministries who field representatives to ICAO and IMO and who are close to their home aviation and shipping industries, and the corresponding Environment and Climate Change Ministries with responsibility for climate change policy.

UNFCCC also bears responsibility for having listened passively to a decade of upbeat 'progress reports' from ICAO and IMO detailing much discussion but very little action. The UNFCCC has placed itself in the position of risking failure at Copenhagen if bunker fuel emissions, which account for almost 10% of the world's climate change problem, aren't finally tackled.

## NGO Position

NGOs believe that the Copenhagen Agreement should:

- Decide that bunker GHG emissions must reduce to at least 40% below 1990 levels by 2020 and at least 80% below 1990 levels by 2050 - figures consistent with the latest estimates of reductions required to limit global warming to below 2°C. Aviation and shipping would have access to the global carbon markets, but the right to buy permits from outside the sector would be conditional on a given quantity of reductions having been achieved within the sector (a so called “qualitative gateway”).
- Decide that attainment of these targets is impossible without a comprehensive mix of mandatory market-based (GHG levies and/or trading) and technical measures (energy efficiency standards for new and existing aircraft/ships and low carbon standards for fuels).
- Call on ICAO and IMO to agree on effective mandatory market based measures to address bunker emissions and develop proposals on implementation and oversight. These proposals should be brought to and endorsed by COP 16.
- Decide that market-based measures should be global, should take effect from 2012 and take account of CBDR through a) exemptions for routes to and from least developed countries that together do not exceed 2% of GHG emissions and b) differentiated allocation of revenues.
- Decide that these revenues should be collected by or allocated to an international fund and be used exclusively for adaptation and climate change needs in developing countries
- Call on IMO to develop and finalise fuel efficiency standards for new and existing ships by the end of 2010 with mandatory application globally by 2012.
- Call on ICAO to develop mandatory fuel efficiency standards for new and existing aircraft for implementation by the end of the next CAEP cycle (2013).
- Request IPCC, ICAO and IMO to re-examine and fund research as necessary on the non-CO<sub>2</sub> impacts of aviation and shipping including NO<sub>x</sub>, contrails, clouds and black carbon, with a view to taking comprehensive action at COP 16.
- Call on ICAO and IMO to continue work on other operational measures to reduce GHG.

